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(54) **An alarm system for a barrier**

(57) A retractable belt barrier has a post 2 in which a reel for a belt 4 is mounted. A required length of the belt 4 may be pulled off the reel to provide a barrier by connection with a second post. An alarm system is housed within a unit 8 on the post 2 and includes sensor means (12, Fig 2 not shown) arranged to sense rotation of the reel and to indicate an alarm condition in response thereto. The alarm system is battery powered and includes a battery power detector (LB1) for monitoring the electrical power available, and is designed so that the system draws a minimum of power in the absence of an alarm condition.

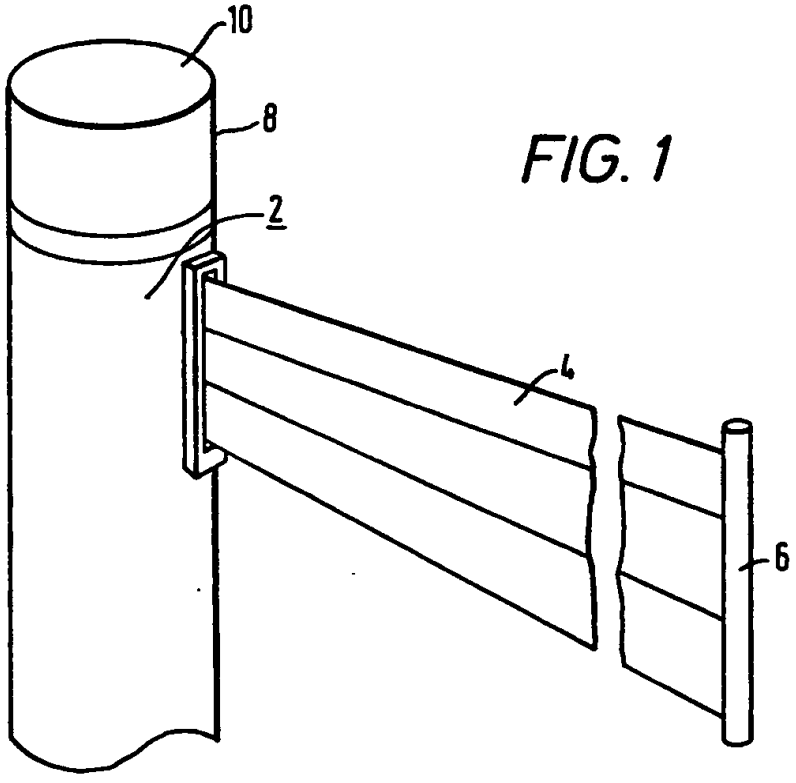

FIG. 1

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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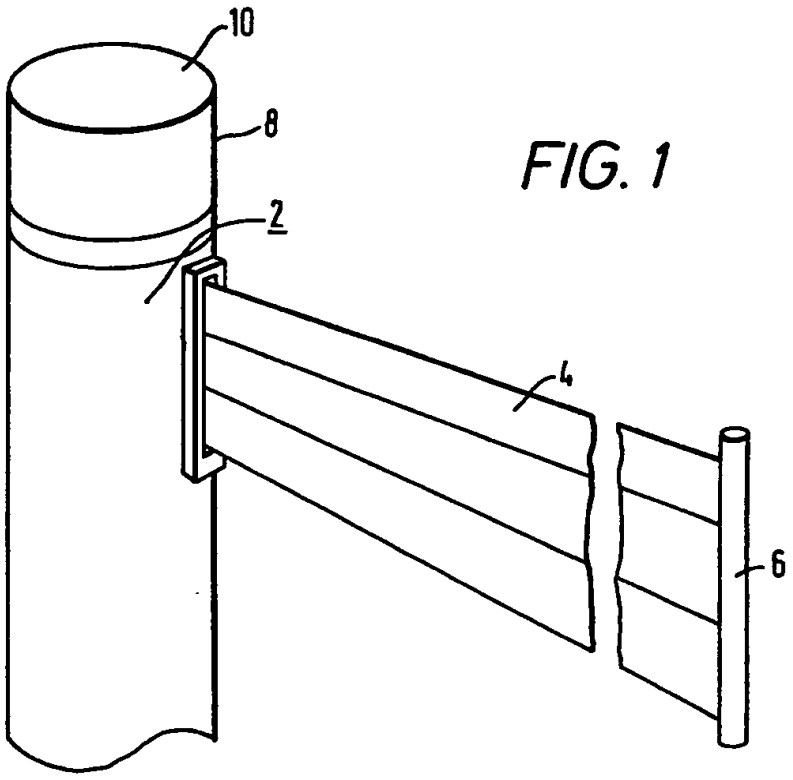
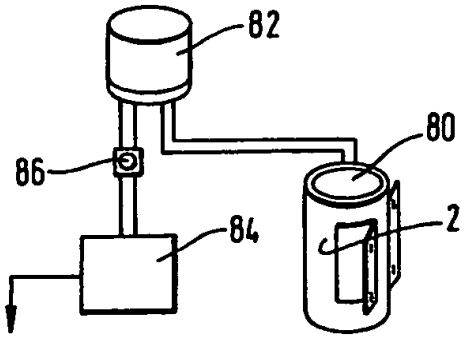


FIG. 1

FIG. 3



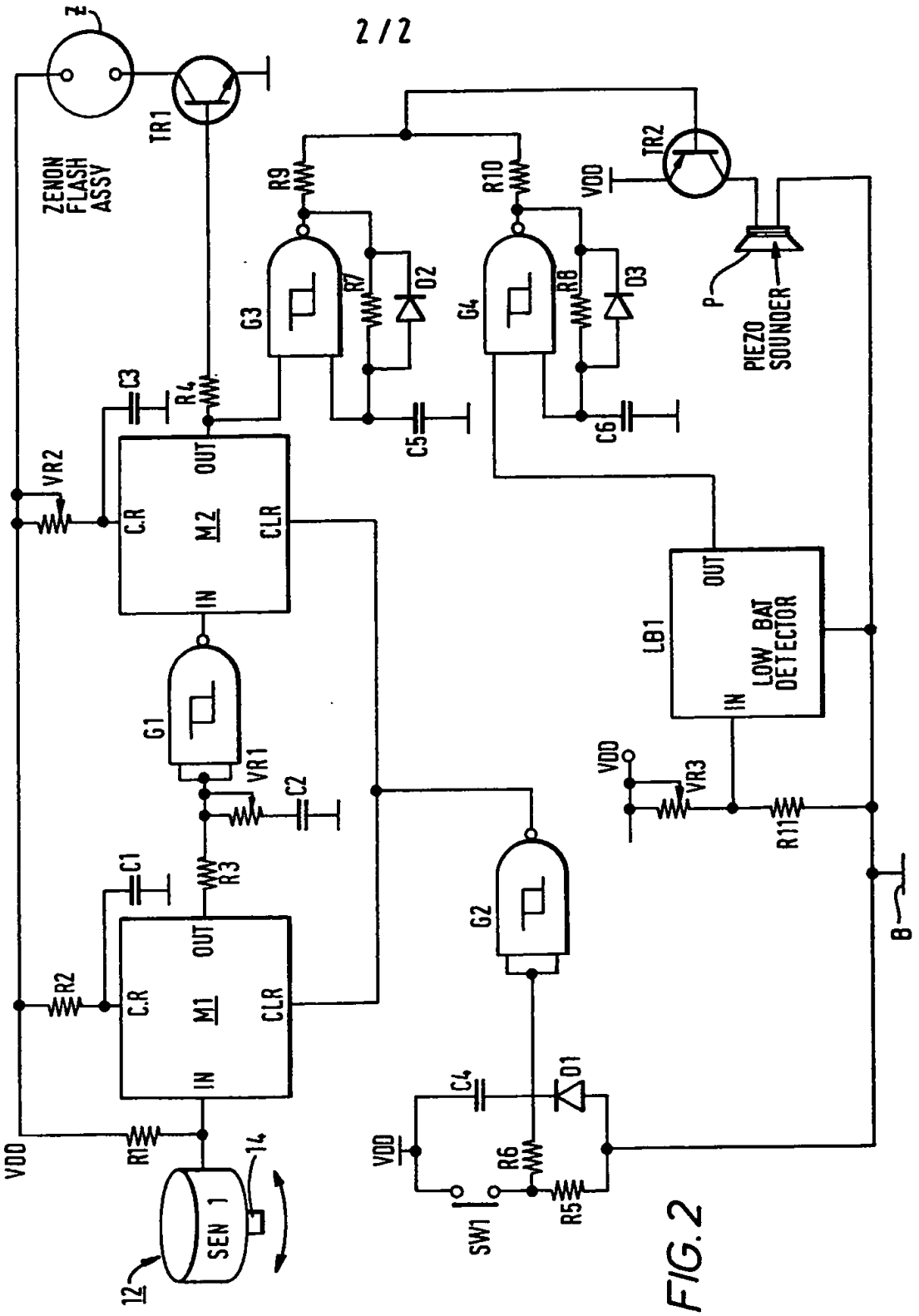

Z
ZENON FLASH ASSY
TR1
TR2
R9
R10
VDD
G3
G4
R7
R8
D2
D3
P
PIEZO SOUNDER
C3
R4
C5
C6
VR2
C.R
M2
CLR
OUT
IN
G1
VR1
C2
C1
R3
R2
M1
R1
VDD
14
SEN 1
12
LB1
LOW BAT DETECTOR
VR3
R11
B
G2
C4
D1
R6
R5
SW1

FIG. 2

AN ALARM SYSTEM FOR A BARRIER

The present invention relates to an alarm system for a barrier.

It is frequently required to provide barriers to control or guide the movement of people or to prevent their access to various areas. Often, the barriers serve more to inform people of the required route, rather than presenting a physical barrier. For example, pivotable gates or retractable belts may be positioned across check-out lanes in supermarkets to indicate those lanes which are not to be used.

Where an area is controlled by barriers, it is useful to be warned if the barrier is adjusted or moved. In a situation where the barrier does not provide a physical barrier able to bar passage or prevent access, for example where it is indicating that a supermarket check-out lane is closed, it is important that an alarm is provided to signal if the barrier is breached.

Of course, many different sorts of alarms for detecting the presence or movement of intruders are available. However, these often rely on sensing the presence or movement of people in the controlled area and are often expensive to install.

According to a first aspect of the present invention there is provided an alarm system for a barrier, said alarm system comprising sensor means arranged to detect the existence of an alarm condition associated with said barrier, and alarm means responsive to said sensor means and arranged to generate an alarm signal in response to the existence of an alarm condition, wherein said alarm system is connectible to

an electrical power source, and wherein said alarm system is arranged to draw little or no power from said electrical power source in the absence of an alarm condition, and wherein said alarm system further comprises power monitoring means arranged to monitor the electrical power available from said electrical power source.

An alarm system of an embodiment of the invention is arranged to draw little or no power when there is no alarm condition. This means, that the alarm system can be sensibly powered by way of a battery, if required, and therefore that the alarm system does not need to be plugged into the mains. This in its turn enables a stand alone alarmed barrier to be provided at any location.

Because the alarm system takes little or no power in its quiescent state, it is important to ensure that power will be available if required by the existence of an alarm condition, and this is the function of the power monitoring mean provided. In an embodiment, the power monitoring means is arranged to detect the voltage level of the power supply available. Warning means are preferably provided which are responsive to said power monitoring means and are arranged to generate a warning signal if the available voltage falls below a predetermined level.

Indicating means may be provided and arranged to be responsive to said alarm signal and/or said warning signal. The indicating means may be arranged to provide an audible, or a visual indication of the alarm or warning condition, or both. Respective indicating means may be arranged to be responsive to the alarm or warning signals, or common indicating means may be provided.

Even where common indicating means are provided it is preferred that the response thereof to the warning and to the alarm signals should be distinct and distinguishable. For example, the indicating means may be caused to provide different sounds, or to provide illumination at different flashing rates to distinguish between the receipt of a low voltage warning signal and an alarm signal signalling the existence of an alarm condition.

In a preferred embodiment, the power monitoring means comprises a voltage comparator arranged to receive a predetermined proportion of the source voltage. For example, a voltage divider may be provided to couple the power monitoring means to the voltage source. The power monitoring means is arranged to compare the voltage level tapped from the source with a reference voltage, and to provide a warning signal only where the tapped voltage level falls below the reference voltage.

In an embodiment, the sensor means is arranged to be responsive to movement of said barrier.

According to a further aspect of the present invention there is provided an alarm system for a barrier, said alarm system comprising sensor means arranged to detect the existence of an alarm condition associated with said barrier, and alarm means responsive to said sensor means and arranged to generate an alarm signal in response to the existence of an alarm condition, and wherein said sensor means is arranged to be responsive to movement of said barrier.

In an embodiment, where said barrier is a pivotable door or gate, the sensor means may be arranged to respond to pivoting movement of the barrier and/or of a

pivot axle thereof. Alternatively, where said barrier is a retractable belt or webbing, the sensor means may be responsive to the withdrawal or retraction of the belt or webbing. Commonly, such a belt or webbing is arranged to be wound around a reel, spindle or bobbin, and in this circumstance, the sensor means may be arranged to respond to pivoting movement of the reel or spindle.

In a preferred embodiment, where pivoting or rotary movement of a part of, or associated with, the barrier is to be detected, said sensor means may comprise a rotary encoder having a rotatable member coupled to said part whose rotary movement is to be detected. The rotary encoder may be, for example, a mechanical switch type encoder in which the rotatable member is a rotatable switch arm movable over a plurality of spaced contact pads. Such an encoder draws no, or a very low, current when stationary and produces a digital output directly. Of course, other types of rotary encoders can be used. Additionally and/or alternatively, other types of sensors may be provided. For example, the sensor means may comprise photo-electric, magnetic, inductive or piezo-electric sensors.

In a preferred embodiment, said alarm means is arranged to generate an alarm signal only in response to an output from said sensor means which meets predetermined criteria.

It is important with an alarm system to minimise the existence of false alarms in order to maintain the integrity of the system and to thereby ensure that all alarm conditions signalled are appropriately responded to by staff. Clearly, fleeting abnormal conditions can always arise and it is important that such transient

conditions do not generat an alarm signal. In a pr ferred embodiment, the sensor means is arranged to detect movement of the barrier. In this case, it is important that the alarm system discriminate between small movements, for example, caused by changes in air pressure or by the accidental brushing of the barrier by a person passing, and actual alarm conditions where the barrier is physically moved. Therefore, it is generally required that the predetermined criteria set minimum response levels which have to be met in order that an alarm is generated.

For example, the alarm means may comprise a delay circuit requiring that the alarm condition persist for at least a minimum predetermined time before an alarm signal is generated. Additionally and/or alternatively, the alarm means may comprise a threshold circuit requiring that the alarm condition exceed a predetermined minimum value before an alarm signal is generated. For example, where the sensor means is arranged to detect movement, movement in excess of a predetermined minimum distance can be required to occur for an alarm signal to be generated.

Preferably, the alarm system comprises one or more indicating means arranged to signal the existence of an alarm condition upon the receipt of an alarm signal. The, each or some of the indicating means may also be activated by the arrival of a warning signal. The indicating means may be audible warning devices, visual warning devices, or any other indication devices. Additionally and/or alternatively, the alarm and/or warning signals may be fed to output terminals connectible to one or more external indicating means.

In a preferred embodiment the indicating means may

comprise at least one visual warning device, for example comprising a light source which may be flashed. The indicating means also preferably comprises at least one audible warning device. Preferably, the alarm signal is arranged to activate both the visual and the audible devices whilst the warning signal is arranged to activate only a selected one of them.

Additionally and/or alternatively, the alarm system may be provided with transmission means for transmitting alarm and/or warning signals to remote locations. The transmission may be by way of wire, radio, infra-red or ultrasonic means.

In a preferred embodiment, an alarm system of the invention preferably includes means enabling adjustment of the predetermined criteria determining the conditions in which an alarm signal is generated. Furthermore, adjustment means for adjusting the comparison level of the power monitoring means may be provided.

In a preferred embodiment, reset means for resetting or disabling the system may be provided. Additionally and/or alternatively, automatic resetting means may be arranged to reset the alarm system a predetermined time after an alarm signal has been generated.

The invention also extends to a barrier in which an alarm system as defined above is incorporated.

Embodiments of the present invention will hereinafter be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 shows a perspective view of a retractable belt barrier provided with an alarm,

Figure 2 shows a circuit diagram of the alarm of the barrier of Figure 1, and

Figure 3 shows the provision of a remote alarm for a retractable belt barrier.

Figure 1 indicates a retractable belt barrier which may be used to control the passage of people in various situations. The barrier comprises a post 2 in which a spring mounted bobbin or reel (not shown) is mounted. A belt, webbing or other elongate material 4 is wound around the reel. The free end of the belt 4 is attached to a grip device 6. In use, the grip device is held and is used to pull a length of the belt 4 off its reel against the action of the spring force. The grip device 6 is pulled out until it can be clipped on to an appropriate holder (not shown). The holder can be provided on a similar post as 2 or on a wall or other existing structure. The belt 4 thereby provides a barrier which, if arranged across a passageway, such as a check-out lane in a supermarket, prevents passage of people through that lane. Alternatively, the belt 4 may be arranged along the side of a pathway to define the pathway for guiding the passage of people. Such retractable belt barriers are known and their mechanical construction is not therefore described further herein.

It will be appreciated that a retractable belt barrier such as that shown in Figure 1 does not provide a physical barrier to the passage of a person. For example, where it is used to extend across a passageway it can only indicate that passage therethrough is barred. It is still possible for people to pass through the passageway. For example, the grip device 6 could be unhooked from its holder and the belt 4 allowed to be rewound into the post 2, or the grip device 6 could be temporarily unhooked and then refixed to the holder to

enable a person to move around the belt 4. Alternatively, the person requiring access to the barred passageway could simply cause more of the belt 4 to be drawn out of the post 2 by pulling so that the belt can be moved either downwardly, and stepped over, or upwardly whereby the person can walk underneath.

The retractable barrier illustrated in Figure 1 includes an alarm system arranged to signal, by both audible and visual indicating means, when movement of the belt is caused. In this respect, the alarm system is housed within a unit 8 fixed to the top of the post 2. The upper surface of the alarm unit is defined by a translucent or transparent window 10 arranged to be illuminable by visual warning means of the alarm system. The unit 8 also includes audible warning means, not visible in Figure 1. If required, the cylindrical wall of the unit 8 may be provided with a number of holes to facilitate the passage of audible warnings out of the unit.

Figure 2 shows schematically a circuit diagram of the alarm system housed within the unit 8 of Figure 1. The alarm system comprises a sensor means in the form of a mechanical type rotary switch encoder 12 coupled to the reel (not shown) on which the belt 4 is wound. In the embodiment illustrated, the mechanical encoder 12 comprises a rotary shaft 14 which is coupled directly to the reel of the belt 4 if necessary, the shaft 14 can be extended, for example, by connection to a further shaft, and the shaft 14 or its extension is directly fastened to the reel in any suitable manner. For example, adhesive, screws or clamps may be used to provide the fastening. The shaft 14 of the encoder 12 is connected to, and arranged to rotate, a switching arm (not shown) of the encoder 12. As it rotates, the switching arm

moves over a plurality of circumferentially arranged, angularly spaced contact pads (not shown). For example, forty such contact pads can be provided around the circumference of the rotary encoder 12 such that forty output pulses can be generated for a 360° rotation of the switching arm.

It will therefore be appreciated that as the belt 4 is pulled out of, or retracted into, the post 2 rotation of the switching arm of the encoder 12 by way of the shaft 14 will occur. A dc electrical supply is connected across the encoder 12 and so a pulse train will be generated thereby. The number of pulses generated is dependent upon the angular rotation of the switching arm, and hence of the reel, and is independent of the direction of that rotation. The alarm system circuit shown in Figure 2 is arranged to flash a light visible by way of the window 10 and to sound an audible alarm if the angular rotation of the reel is above a predetermined minimum.

The particular alarm circuit illustrated in Figure 2 is a dc circuit powered by one or more batteries (not shown) connected to a positive VDD rail and a base rail B. The VDD rail is connected to the output of the encoder 12 which is generally connected to the rotatable switching arm. The contact pads of the encoder 12 can be connected to an earth, for example, the body of the encoder. The current drawn by the encoder 12 is clearly determined by its resistance, and this resistance is increased by the incorporation of a high value, for example several megohms, resistor R1 between the positive VDD rail and the encoder 12. In this way, the encoder 12 is arranged to draw low current. The pulsed output of the encoder 12 is fed to the input of a CMOS monostable M1. In known manner, the monostable M1 has a

timing circuit comprising a capacitor C1 and a resistor R2 connected to a control input CR which acts to determine the width of the pulses output from the monostable M1. The monostable M1 can be controlled to produce an output pulse for each rising or each falling edge of the input pulses. Alternatively, multiple inputs can be used so that both rising and falling edges of the input pulses can trigger the monostable M2.

The output pulses from the monostable M1 are fed to the shorted inputs of a triggerable NAND gate G1. This is arranged to produce a low level output signal only when the voltage on its two inputs reaches a predetermined threshold value. The threshold value to be reached is determined by the CR circuit comprising a resistor R3, a variable resistor VR1 and a capacitor C2 connected in series to the output of the monostable M1. The voltage threshold level is determined by the voltage divider constituted by resistor R3 and variable resistor VR1 and can be adjusted by adjustment of the resistor VR1. It will be appreciated that when a train of pulses is output from the monostable M1 the capacitor C2 will begin to be charged. It is only when the capacitor C2 has been charged that a voltage above the threshold level appears at the inputs of the gate G1 and thereby causes a low level signal to appear on its output.

The output of the triggerable NAND gate G1, which provides a threshold circuit of the alarm system, is applied to the input of a second CMOS monostable M2 arranged to be triggered by falling edges. Thus, when a low level signal appears on the output of gate G it is fed to the input of the monostable M2 which therefore produces output pulses in response to the arrival of one or more low level signals. Again, the width of the output pulses is determined by a CR circuit comprising a

capacitor C3 and a variable resistor VR2 connected to the control input CR of the monostable M2. The values of the capacitor C3 and of the variable resistor VR2 are chosen to delay the output pulses as compared to the input pulses and clearly the timing can be adjusted by way of the variable resistor VR2. The delay time is chosen to minimise the risk that transient conditions produce an alarm.

It will be seen that the high level output pulses of the monostable M2 are applied to the base of a PNP transistor TR1 by way of a resistor R4. The emitter of this transistor TR1 is connected to the base rail B such that the application of a high level pulse to the base of the transistor TR1 tries to switch on the transistor. The collector load of the transistor TR1 is a visual warning device in the form of a low current zenon flash assembly Z having one terminal connected to the collector of the transistor TR1 and its other terminal connected to the positive VDD rail. Accordingly, when high level pulse is applied to the transistor base, the transistor turns on and the zenon flash assembly Z conducts. Generally, fairly modest movement of the belt 4 causes a large number of output pulses to be output by the encoder 12 and hence a large number of pulses will be sequentially applied to the base of the transistor TR1. This switches the transistor TR1, and hence the zenon flash assembly Z on and off whereby a flashing light alarm signal is generated. This is arranged in the unit so that the flashing indication appears in the window 10.

The output pulses from the monostable M2 are also fed to one input of a gated oscillator comprising a NAND gate G3 and a relaxation circuit comprising a feedback resistor R7, connected to the second input of the gate

G3, and a capacitor C5 connected between the second input and the base rail B. Initially, there is no input to the first gate input such that its output is high level whereby the capacitor C5 is charged, hence holding the second input of the gate at a high level. Accordingly, as soon as an output pulse arrives from the monostable M2, a low level pulse is put on the output of the gate G3 causing the capacitor C5 to discharge by way of the resistor R7. This changes the second gate input to low level whereby a high level output pulse is generated at the gate output to cause the cycle to repeat. It will be seen that a diode D2 is connected across the resistor R7 to aid in the discharging of the capacitor C5 and hence to cause asymmetric charge and discharge time cycles. It will therefore be appreciated that the arrival of output pulses at the monostable M2, representative of an alarm condition, causes the oscillation of an oscillator circuit defined by the NAND gate G3 and its associated relaxation circuit C5, R7, D2. Therefore, pulses are generated at the output of the NAND gate G3 which are fed by way of a resistor R9 to the base of an NPN transistor TR2. It will be appreciated that these pulses turn the transistor TR2 on and off whereby a piezo-electric audible warning device P, connected as a base load to the transistor TR2, is caused to generate an audible warning in accordance with the pulsed signals received.

The circuit shown in Figure 2 is automatically reset. Thus, if the pulsed input to the monostable M1 ceases because there is no further movement detected by the encoder 12, the flash assembly Z and the piezo-electric sounder P will cease to be supplied with drive signals. In addition, the circuit is provided with a reset circuit to disable the alarm system for a short period, for example to enable the circuit to be

set up. The reset circuit comprises a printed circuit mounted switch SW1 connected between the power rails VDD and B in series with a resistor R5. A capacitor C4 is connected across the switch SW1. The node between the switch SW1 and the resistor R5 is connected to a further resistor R6 which is in turn connected to the node between the capacitor C4 and a diode D1 arranged in the reverse direction. The capacitor C4 and resistors R6 and R5 provide a timing circuit. In this respect, it will be seen that the capacitor C4 is connected between the two power rails VDD and B in series with the diode D1 which thus prevents discharge of the capacitor C4 when the switch SW1 is open. Thus, in the stable condition, with the switch SW1 open, the voltage across the capacitor C4 is applied as a high level signal to both inputs of a NAND gate G2 whereby a low level signal appears on its output. The output terminal of the gate G2 is connected to a reset terminal of each of the monostables M1, M2. If the switch SW1 is closed, the capacitor C4 discharges and a low level signal is then put on both of the input terminals of the NAND gate G2. Its high level output is then applied to the reset terminal of each of the monostables M1 and M2 which are thereby reset. The high level reset signal remains on the reset terminal of each of the two monostables M1, M2 until the switch SW1 is opened. On opening of the switch SW1, the capacitor C4 is charged from the rails VDD and B by way of the resistors R5 and R6. When the capacitor C4 has been charged, the reset circuit again assumes the stable condition in which the high level signal is applied to the inputs of the gate G2 and there is a low output thereby applied to the reset terminals of the monostables M1 and M2.

The switch SW1 may be spring biased to its open position to provide for instantaneous reset, for example if a false alarm is detected. Thus, on an alarm being

indicated, the switch SW1 would be closed to reset the monostables M1 and M2. The spring biasing would then return the switch to its open position. In this case, the switch SW1 could be push-button actuated. Additionally, and/or alternatively, it would be possible to provide actuating means for the switch SW1 selectively latchable in a switch ON or a switch OFF position. The ability to latch the switch closed is particularly useful when the alarm system is to be set up initially.

Where there is no alarm condition, the encoder 12 and the monostables M1 and M2 take no current. The only current required by the alarm system is any which is necessary to compensate for leakage of the charged capacitors, as C1 and C3. Therefore, in a non-alarm condition, very little power is used by the alarm system. However, it is important that power is available at all times so that the alarm system is able to activate the warning devices if an alarm condition is detected. Where the power supply is by way of batteries, it is particularly important that the condition of the batteries is continuously monitored. In this respect, the alarm system includes a power monitoring circuit in the form of a low battery detector LB1 which is supplied with a proportion of the battery voltage. Thus the input of the detector LB1 is connected to a voltage divider comprising a series combination of a resistor R11 and a variable resistor VR3 connected between the power rails VDD and B to which the battery is connected. It will be appreciated that variation of the resistance of resistor VR3 adjusts the voltage fed to the input of the detector. The detector LB1 includes an internal voltage reference against which the input voltage is compared. If the input voltage is found to be below the reference voltage, a positive

signal is put on the output of the detector circuit LB1 and this is applied to one input of a NAND gate G4. As in the case of the NAND gate G3, the NAND gate G4 has an associated relaxation circuit comprising a series combination of a resitor R8 and a capacitor C6 connected to its output, the resistor R8 having a diode D3 connected thereacross in the forward direction. Accordingly, and as described above with reference to the gate G3, the arrival of a high signal at the gate G4 from the detector LB1 causes the gate G4 to produce a series of output pulses at its output whose timing is dependent upon the values of the resistor R8 and the capacitor C6, but which have an asymmetrical mark space ratio. The output pulses are fed by way of a resistor R10 to the base of the transistor TR2 and thereby cause the audible warning device P to provide an audible alarm. Preferably, the capacitor C6 and resistor R8 are arranged to have a different timing characteristic to that of the capacitor C5 and the resistor R7 associated with the gate G3 so that the audible warning of a low battery has a different sound to that of an audible warning of an alarm condition.

The alarm system shown in Figure 2 is mounted in the post 2 of the retractable belt barrier to thereby provide a stand-alone, alarmed barrier. In this case, the battery unit will preferably be housed within the alarm unit 8. However, it may be preferred, for example, where the barriers are permanently or semi-permanently installed, to power the alarm units from the mains. It may also be required to provide the alarm warning devices remote from the barriers themselves.

An arrangement providing mains power and remote warning devices is shown in Figure 3 which indicates a

barrier post 2 having a sensor unit 80 incorporated therein. This sensor unit 80 may house an encoder such as 12. The sensor unit 80 is electrically connected to an alarm unit 82 which houses an alarm circuit, for example, as shown in Figure 2, including the audible and visual warning devices. The alarm unit 82 is located remotely of the barrier. The alarm unit 82 is connected to the mains by way of an ac to dc convertor 84. A push-button 86, for example, for actuating the reset switch SW1 is also provided.

The invention has been described with particular reference to a retractable belt barrier, but the alarm system may be used with any barriers. For example, where the barrier is a pivotable gate or door the sensor means may be arranged to be responsive to pivoting movement thereof.

Where the sensor means is to detect pivoting or rotary movement of a part of, or associated with, the barrier, a rotary encoder is particularly suitable for the sensor. However, other types of sensors may be provided. For example, the sensor means may comprise photo-electric, magnetic, inductive or piezo-electric sensors.

Other modifications and variations may be made to the invention as described and illustrated within the scope of this application.

CLAIMS

1. An alarm system for a barrier, said alarm system comprising sensor means arranged to detect the existence of an alarm condition associated with said barrier, and alarm means responsive to said sensor means and arranged to generate an alarm signal in response to the existence of an alarm condition, wherein said alarm system is connectible to an electrical power source, and wherein said alarm system is arranged to draw little or no power from said electrical power source in the absence of an alarm condition, and wherein said alarm system further comprises power monitoring means arranged to monitor the electrical power available from said electrical power source.

2. An alarm system as claimed in Claim 1, wherein said power monitoring means is arranged to detect the voltage level of the power supply available.

3. An alarm system as claimed in Claim 2, further comprising warning means which are responsive to said power monitoring means and are arranged to generate a warning signal if the available voltage falls below a predetermined level.

4. An alarm system as claimed in any preceding Claim, further comprising indicating means arranged to be responsive to said alarm signal and/or to a warning signal.

5. An alarm system as claimed in Claim 4, wherein said indicating means are arranged to provide an audible, or a visual indication of the alarm or warning condition, or both.

6. An alarm system as claimed in any preceding Claim, wherein the power monitoring means comprises a

voltage comparator arranged to receive a predetermined proportion of the source voltage, and to compare the voltage level received from the source with a reference voltage, and to provide a warning signal only where the received voltage level falls below the reference voltage.

7. An alarm system as claimed in Claim 6, wherein a voltage divider is provided to couple the power monitoring means to the voltage source.

8. An alarm system as claimed in any preceding Claim, wherein the sensor means is arranged to be responsive to movement of said barrier.

9. An alarm system for a barrier, said alarm system comprising sensor means arranged to detect the existence of an alarm condition associated with said barrier, and alarm means responsive to said sensor means and arranged to generate an alarm signal in response to the existence of an alarm condition, and wherein said sensor means is arranged to be responsive to movement of said barrier.

10. An alarm system as claimed in Claim 9, where said barrier is a pivotable door or gate, and wherein the sensor means is arranged to respond to pivoting movement of the barrier and/or of a pivot axle thereof.

11. An alarm system as claimed in Claim 9, where said barrier is a retractable belt or webbing, and wherein the sensor means is responsive to the withdrawal or retraction of the belt or webbing.

12. An alarm system as claimed in any of Claims 9 to 11, where pivoting or rotary movement of a part of, or associated with, the barrier is to be detected, said sensor means comprises a rotary encoder having a rotatable member

coupled to said part whose rotary movement is to be detected.

13. An alarm system as claimed in Claim 12, wherein said rotary encoder is a mechanical switch type encoder in which the rotatable member is a rotatable switch arm movable over a plurality of spaced contact pads.

14. An alarm system as claimed in any preceding Claim, wherein said alarm means is arranged to generate an alarm signal only in response to an output from said sensor means which meets predetermined criteria.

15. An alarm system as claimed in Claim 14, wherein said sensor means is arranged to detect movement of the barrier, and wherein the predetermined criteria set minimum response levels which have to be met in order than an alarm signal is generated.

16. An alarm system as claimed in Claim 15, wherein said alarm means comprise a delay circuit requiring that the alarm condition persist for at least a minimum predetermined time before an alarm signal is generated.

17. An alarm system as claimed in Claim 15 or 16, wherein said alarm means comprise a threshold circuit requiring that the alarm condition exceed a predetermined minimum value before an alarm signal is generated.

18. An alarm system as claimed in any preceding Claim, further comprising one or more indicating means arranged to signal the existence of an alarm condition upon the receipt of an alarm signal, and wherein each or some of the indicating means is also arranged to be activated by the arrival of a warning signal.

19. An alarm system as claimed in Claim 18, wherein said indicating means are audible warning devices and/or visual warning devices, and the alarm and/or warning signals are fed to output terminals connectible to one or more external indicating means.

20. A barrier incorporating an alarm system as claimed in any preceding Claim.

21. An alarm system for a barrier substantially as hereinbefore defined with reference to the accompanying drawings.

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